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ABSTRACT

This manual presents methodology for maintaining a social reinforcement system after supervisors in industrial environments have been trained in behavior modification theory and application. The maintenance manual discusses monitoring, evaluation, and integration of a company's employee performance system with the social reinforcement system applied by the supervisors. This is one of four manuals designed to aid supervisors in the training of disadvantaged employee groups. Related documents are available as VT 018 031-018 035 in this issue. (MF)

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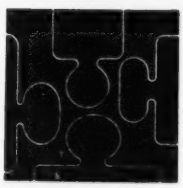

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HOW TO MAINTAIN A SOCIAL REINFORCEMENT PROGRAM

Submitted to:

Office of Research and Development

Manpower Administration

U. S. DEPARTMENT OF LABOR

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16. Abstracts

This document is one of four manuals designed to aid supervisors in the training of employees, particularly hardcore disadvantaged. Its specific purpose is to enable management to strengthen, broaden, and generally maintain an established, operational social reinforcement system. This manual provides guidelines for the maintenance of a social reinforcement system by the individual charged with training supervisors.

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FOREWORD

The contents of this manual were tested under a U.S. Department of Labor, Manpower Administration, Research and Development Contract No. 82-05-70-05. The manual derives from a project known as Operation Pathfinder, conducted in Los Angeles by the Mentec Corporation.

Mentec Corporation extends its appreciation to the five hundred foremen, supervisors, and managers of over one hundred companies and public agencies who since 1967 contributed to the development and success of this project.

For further information concerning the contents of this manual or its utilization in Operation Pathfinder, contact the Office of Research and Development, Manpower Administration, U.S. Department of Labor, Washington, D.C.

This document is one of four manuals designed to aid supervisors in the training of employees, particularly hardcore disadvantaged. Its specific purpose is to enable management to strengthen, broaden and generally maintain an established, operational social reinforcement system. The three companion documents are:

- Job/Behavioral Analysis Manual
- How to Train Supervisors in Behavior Modification
- Supervisory Workbook on Behavior Modification

Theoretical rationale and supporting evidence underlying these manuals are presented in a report entitled:

- Operation Pathfinder: Shaping Work Behavior of Ex-Offenders and Other Disadvantaged People Using Social Reinforcement Techniques

I. INTRODUCTION

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The objective of this manual is to present methodology for maintaining a social reinforcement (SR) system. Such a system is, by definition, dynamic and constantly enlarging. It involves continuous interactions of people and provides flexibility to meet new situations. "Maintenance," therefore, implies more than simply preserving something which has been established; it also implies a capability to grow.

The systematic application of SR in industrial environments has been shown to yield effective and practical consequences. In many respects, it can be viewed as a behavioral tool, in much the same way that a saw is observed as a carpenter's tool. Both are useful to the extent that they are employed appropriately and to the extent that provision is made for at least periodically checking the quality of the resulting "products." Therefore, the individual or individuals responsible for implementing an SR system (hereafter referred to as the "trainer") should be prepared to monitor and evaluate the effectiveness of the system in as objective a manner as possible.

Use of this manual assumes that supervisors have been trained in the theory and application of behavior modification and that an SR system has been or will be implemented. The concern here is with (1) determining how well the system is performing, (2) correcting deficiencies and (3) instituting mechanisms which facilitate its maintenance. To some extent, a maintenance manual is similar to a training manual. That is, a training manual is used to train supervisors in the shaping of workers' behaviors, and a maintenance manual is used to maintain and strengthen these new supervisory behaviors. Both processes involve primarily the liberal use of social reinforcement. However, since the use of SR is amply described in the accompanying manuals, this document will be restricted to discussing the remaining elements of a maintenance program, namely, monitoring, evaluation and integration of a company's existing incentive system with the SR system.

II. MONITORING AND EVALUATION

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A. MONITORING

The purpose of an SR program, of course, is to facilitate the performance of workers. The magnitude and maintenance of such facilitation must be determined by measuring those performance variables that are typically of concern to a company. Major variables relevant to most industrial firms include:

- o Rate of production
- o Quality of work
- o Rate of absenteeism
- o Rate of tardiness
- o Rate of turnover
- o Rate of grievances
- o Rate of accidents
- o Rate of reprimands
- o Rate of promotion and/or pay increases

Obviously, improvements in performance on any of these variables are determined by contrasting performance data obtained after implementing an SR system with such data obtained before its implementation. Therefore, the trainer should establish a data collection system prior to initiating the supervisor training seminars. Much, if not all, of this data is likely to be collected within the company, in one form or another, as a matter of course. If so, he should ensure that copies of these data are regularly channeled to his office.

1. Baseline Data

The standard by which SR performance data should be compared is referred to as baseline data, i.e., the average performance of a group of workers over a previous segment of time. The length of time used in this calculation

would depend on the stability of group performance. For example, consider the hypothetical productivity curve in Figure 1, representing the average number of units produced per month by 20 workers. It is evident that average productivity varies as a function of the season. Performance is highest during the moderate climatic months and lowest during the extremes. Although the relative difference between the moderate and extreme climatic months is small (seven percent), the absolute difference may be substantial in terms of cost. Thus, this group of 20 workers produced 620 more items during the six moderate climatic months than it did during the remaining six months. If this number of units represents an important gain or loss in profits, then it is clear that baseline performance must be computed from 12 months of data. If, on the other hand, 620 items is considered insignificant compared to the total annual production of 9,260 units, then any two or three months of data may be used to calculate the baseline standard.

Graphs (and associated tabular data) should be developed for each performance variable for each independent group having a single supervisor. Baseline standards should be computed and variations about such standards which are considered insignificant should also be calculated and plotted. For example, Figure 2 shows the indentical curve of Figure 1 but also includes the computed standard (38.7 units) and acceptable deviation from standard, assumed here to be 2.5 units because such an average deviation occurred during the 12 month period.

When graphs and tables are developed for all performance variables for each independent group, the trainer will be prepared to monitor the progress and effectiveness of the newly or about-to-be instituted SR system.

The interested and conscientious trainer will pursue the foregoing simplified procedures much further. For example, if some groups of workers are composed of different racial or ethnic subgroups (and/or other subgroupings) and if it is known that the performance of each subgroup is significantly different from the others, then separate graphs and tables should be developed for each subgroup in order to determine whether the SR system will have similar or different effects on these groups. In effect, a thorough evaluation of the effectiveness of the SR system can only be achieved by such a detailed examination. However, the procedure is relatively simple and, in view of the fact that profits represent the prime interest of most companies, it is clearly worthwhile to determine where the SR system is increasing profits and where it is not.

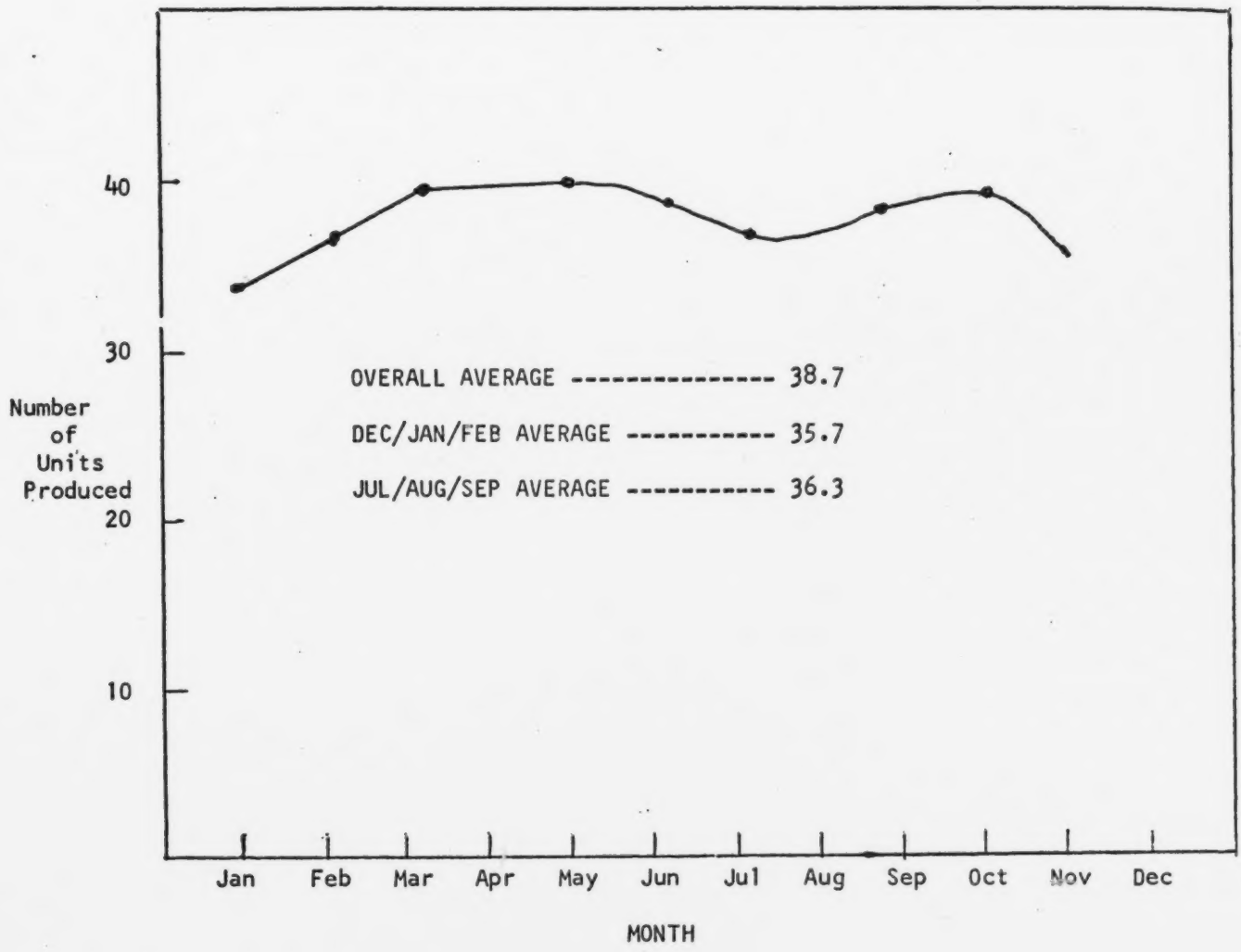

Figure 1. Hypothetical productivity curve for 20 workers as a function of months.

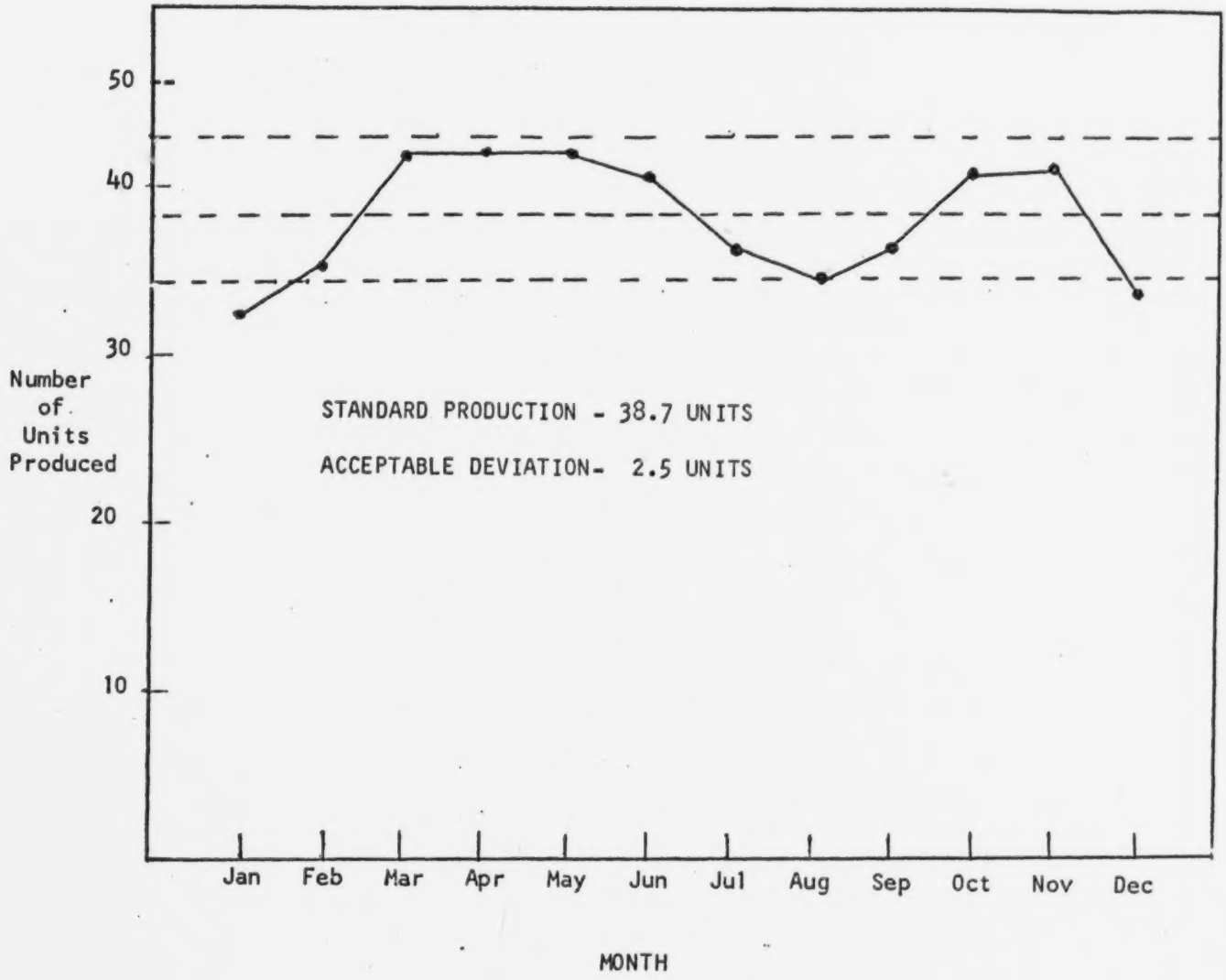

Figure 2. Hypothetical productivity curve showing computed production standard and acceptable average deviation about that standard.

2. Monitoring the Effects of SR

Normally, the institution of an SR system will result in an overall improvement in company performance, as reflected in the increased performance of workers. Depending on a number of factors, such as job difficulty, physical and/or intellectual capabilities of workers, environmental constraints, etc., the magnitude and rate of improvement may vary quite considerably. Therefore, the absolute amount of improvement will be determined only after observing a steady state or asymptotic performance level after the SR system has been fully implemented. This state may require one or perhaps several months, depending again on the above noted job-related factors.

Typical learning curves of industrial workers show a sequence of flat or stable performance levels intermeshed with a sequence of upward performance trends. Figure 3 provides a typical, albeit hypothetical, example of this phenomenon. It should be clear that unless performance is plotted for a reasonable length of time false conclusions may be drawn regarding final steady performance states. In Figure 3, for example, the evidence suggests that this worker's final level of performance has yet to be achieved or, at least, his final potential level of performance has yet to be achieved. It appears that an additional two or three weeks may be necessary before his performance may remain relatively constant.

Final asymptotic performance, aside from physical or environmental factors, will depend on a worker's conscientiousness, motivation (if production above standard results in extra monetary rewards) and willingness to accept group pressures to minimize over-production. Conscientiousness and motivation should require little discussion; everyone varies as to the degree to which each of these variables drives an individual toward fulfilling a company's image of the ideal workers. Also, the positive effects of these variables tend to be counteracted somewhat by the pressures of established group workers who fear a zealot may encourage management to set a new and higher standard of production for all workers. This latter phenomenon is very well known and is noted here to remind a trainer that the ultimate performance level of a worker may bear little relationship with his potential level and that, therefore, a worker may not exhibit a complete learning curve. Be that as it may, however, the stable level that is exhibited is the performance of concern to the trainer as well as the supervisor.

SR obviously cannot facilitate performance if a worker is already performing at his physical and intellectual best. However, few workers ever closely approach their maximum capabilities. And that is the primary basis

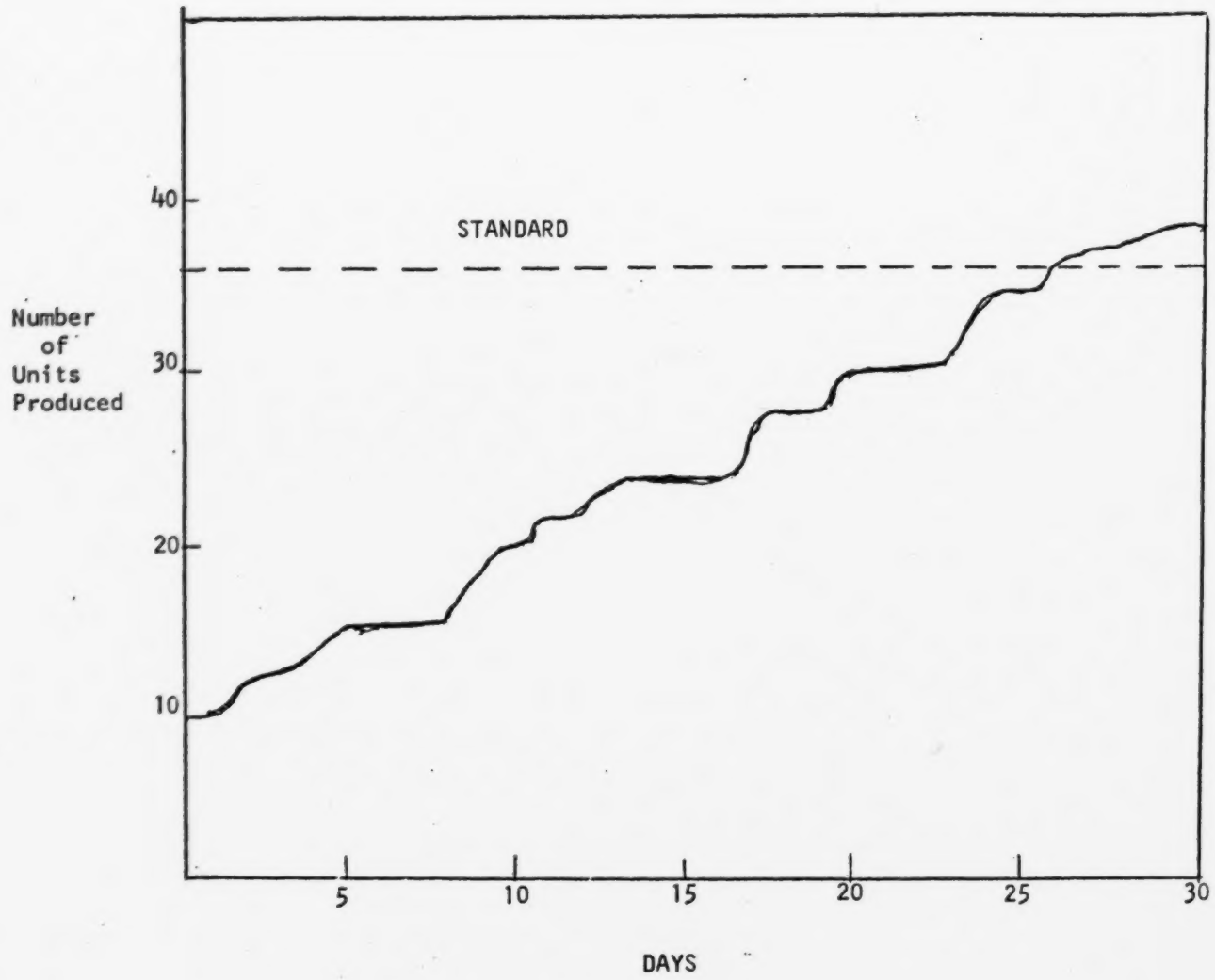

Figure 3. Hypothetical learning curve of an industrial worker during the first 30 days.

for justifying the institution of an SR system, i.e., SR should motivate group workers to more closely approach their real asymptotic performance levels.

Figure 4 shows a hypothetical productivity curve of an established group of workers prior to and following the initiation of an SR system. Average group performance prior to the SR system is depicted as about 37.5 units per day (but plotted on a monthly basis). Seven months subsequent to that time performance is yet to demonstrate a new asymptotic level, although it is likely that performance is quite close to that level. This suggestion derives from the expectation that the total effects of SR should be fully exhibited within the first several months, perhaps within the first month on some types of jobs. In any event, the trainer should withold firm conclusions until there is every indication that performance has truly stabilized.

B. EVALUATION

While it may take some period of time before new asymptotes are reached, continuous monitoring will permit evaluations of the progress, effectiveness, and potential deficiencies of the SR system. Three possible outcomes may result from these evaluations for each group of workers headed by a single supervisor. Overall performance may be essentially identical to baseline levels, (2) lower than baseline levels, or (3) higher than baseline levels.

1. No Performance Difference Observed

No differences in performance may be observed for one or more work groups. Several reasons for this outcome may be given. For example, it may be that the physical work conditions associated with a particular job may be uniquely stressful emotionally and may completely mask the effects of SR. Job difficulty per se is not the issue here, rather it is the umpleasantness of the job or work conditions which reduce job satisfaction. If job satisfaction is very low, the positive effects of SR may be insignificant.

A second reason may be that a particular supervisor may not be using SR techniques or he may not be using them properly. One of the most important characteristics of SR and learning theory in general is consistency in administering rewards and punishments. Adults, as well as children, quickly become confused with regard to knowing what is expected of them if they are sometimes rewarded and sometimes ignored for exhibiting a given behavior.

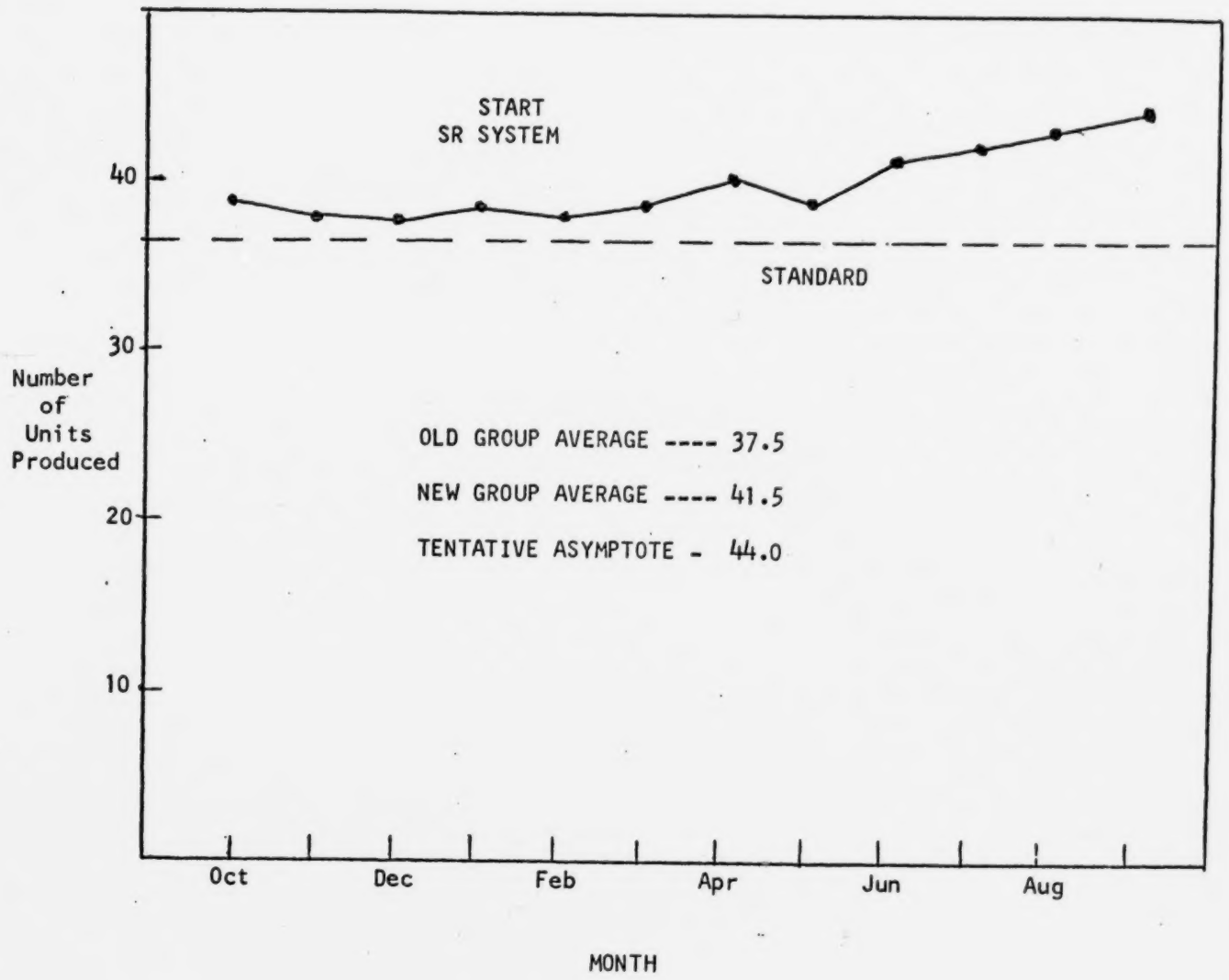

Figure 4. Hypothetical productivity curve prior to and following the initiation of an SR system.

Similar consequences result from sometimes being punished and sometimes being ignored for a given behavior. An unconcerned or unmotivated supervisor is likely to be inconsistent in his interactions with his workers and the effects of SR, when administered, will tend to be negligible, if observable at all. In many cases, inconsistent administration of SR is typical of the supervisor's behavior before his exposure to behavior modification theory.

A third reason for observing no differences in performance may be that the nature of a particular job is such that further improvement is, for all practical purposes, beyond the capabilities of most people. In certain production jobs where a worker repeats a sequence of movements perhaps hundreds of times a day, little improvement may be possible - especially where he is closely monitored and coerced into maximizing his performance continuously. SR cannot increase capability; it can only facilitate and/or encourage a worker to achieve his maximum capability.

2. Observing a Lower Performance

By its very nature the appropriate administration of SR will not result in lower worker performance. To suggest that it could is tantamount to suggesting that workers resent compliments and consistency in their interactions with supervisors. Therefore, if lower worker performance is observed, the trainer should examine the possibility that a supervisor may be actively attempting to prove that an SR system is not as effective as an autocratic system - his system. It is a common finding that many supervisers express the need to rule with an iron hand, "else they'll get away with murder." It is true that there is generally always one or two workers within a group who will constantly attempt to take advantage of management. However, most are receptive and responsive to sincere efforts by management to improve social relations and will react accordingly.

Similarly, attempts to present a stronger autocratic arrangement will almost invariably result in workers minimizing their performance. Such is a natural reaction to mistreatment. It will behoove the careful trainer, therefore, to observe the activities of supervisers whose workers exhibit lower performance following the initiation of the SR system.

3. Observing a Higher Performance

For most job situations, significant and practical increases in performance are expected from use of an SR system. The only real unknown is the degree or magnitude of the increase that can be expected. Since the

institution of SR systems within industry is relatively new and without a large body of research data, the absolute increase in performance on various job types will have to be determined. However, it should be anticipated that increases will be different for different job types, depending on job difficulty and environmental constaints and assuming full participation by supervisors. The trainer should therefore attempt to correlate differences with the characteristics of the various jobs. He should not expect that differences will necessarily reflect inadequate participation by some supervisers, although such an outcome is certainly a possibility. In any event, an adequate maintenance program presupposes sufficient evaluation of cause-effect relationships in order to prescribe necessary future steps, be they corrective or reinforcing in nature.

C. DEVELOPING A FEEDBACK SYSTEM

Learning almost always requires external feedback or objective knowledge of one's performance provided by a trainer. Feedback per se does not necessarily imply information that is essential to learning, however. There are some tasks that are either extremely simple to learn or contain a natural feedback component. For example, driving a car between two white lines provides a natural visual feedback with which the driver can use to maintain proper orientation. On such tasks external feedback would be supplementary and unnecessary and would then tend to act as a reinforcer or motivator. That is, it provides recognition by others that a job is or is not being accomplished as well as it should be.

As noted in the trainer's manual, supervisers must provide feedback to their workers as a natural part of the SR system. It should be clear that feedback is of considerable importance in influencing and maintaining the behaviors of supervisors as well. Thus, the trainer should periodically distribute summary findings of the progress of all worker groups to each supervisor. The interested and involved supervisor will use such findings to evaluate his own performance and to seek ways (including aid from the trainer) which may improve his performance. The uninterested and uninvolved supervisor may feel somewhat encouraged or compelled to alter his behavior when he becomes aware of the fact that his performance is something less than satisfactory, in the eyes of management, when contrasted to others. Thus, feedback contains an element of knowledge and an element of motivation. Combined, they constitute a powerful means by which the trainer and management can modify the behaviors of supervisors.

Although discussed here it is to be understood that a systematic feedback system should be put into operation soon after the initiation of the

SR system in order to maximize its effect. The most logical point in time would be that point at which the trainer has accumulated enough information on all groups to offer reliable and significant trend information. This point may vary from as little as one week to perhaps one month, depending on the type of performance variable that is measured.

III. MAINTENANCE FACILITATION

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A. MAINTAINING THE FEEDBACK SYSTEM

It is assumed that overall company performance has achieved a new, higher baseline level. A point is reached (at asymptote) where continued use of SR will not further increase that level significantly. If it is desired to increase production further, consideration will have to be given job restructuring, new equipment and job aids.

Of critical importance in maintaining the new baseline performance is the need to exercise continuously the established feedback system. Allowing the system to terminate or slowly fade away will, in effect, result in a return to the original company baseline performance, since its absence represents a (albeit negative) behavior modification technique itself.

B. CORRECTING DEFICIENCIES

A feedback system must have some teeth in it in order to be truely effective. That is, supervisors must perceive management as monitoring progress and highly supportive of a full and continuous implementation of the SR system. The trainer must have full approval of management and the supervisors must be aware of this fact. Given this condition the trainer can utilize the feedback system to correct deficiencies in the SR system.

Supervisors completing their training seminar in behavior modification will by no means be experts in the application of SR. They will make mistakes and they will occasionally be inconsistent in their interactions with workers. It is up to the trainer, therefore, to work with the supervisors particularly during the first several months to improve their techniques and correct their inappropriate methods of handling workers. Exceptions to the rule will quickly emerge where SR is working too slowly (or not at all) on some employees and more orthodox means will have to be used. Discussions between the trainer and the relevant supervisor should result in concensus as regards the best course of action to take. In rare cases, a worker may be critically anti-social and termination may be the only practical solution. If a worker does not respond positively to SR, he is less likely to respond positively, in the long run, to more autocratic policies.

In any event, the trainer's job has only begun after completing the training seminar. His main efforts will be directed toward evaluating progress, interacting with supervisors and management, suggesting tactics, and general tutoring.

C. INTEGRATING THE EXISTING COMPANY INCENTIVE SYSTEM

Few people work for nothing. Money is and always will be the prime motivator to work and work effectively. The rationale underlying the use of an SR system is based on the fact commonly known to management that, although essential, money alone will not maximize an employee's performance. In emphasizing SR, however, the importance of the monetary system should never be downplayed or underestimated.

Aside from the normal salary structure, nearly every company has an incentive, merit or bonus system to reward outstanding employees. If it is not already obvious, such systems must be integrated with the SR system to avoid possible conflicts between what is rewarded by SR and what is rewarded by money. Both systems will likely be more or less compatible at the start but such compatibility should be assured by the trainer and management.

Prior to the initiation of an SR system, supervisor and worker performance was presumably acceptable to management. Given a substantial increase in that performance, it will be obvious to all employees that management will reap significant monetary rewards. It will be particularly clear to supervisors whose participation in the seminars and the subsequent SR program was based on the premise that they could maximize worker performance. It is here that the company incentive system should be exercised carefully but liberally. In effect, the supervisors are primarily responsible for the increased profits and they should therefore be rewarded with monetary bonuses, as well as with SR. If such rewards are not forthcoming, it is likely that supervisors will resent their exclusion and, as a group, actively attempt to reduce the productivity of their workers. The new baseline performance would therefore be expected to diminish gradually until it reaches the original level.

The types of bonuses that would be desired by supervisors are diverse and not particulary different from those desired by management. For example, monetary or similar bonuses could be made available on a monthly or quarterly basis. Rewards could be made in terms of time off or expanded vacation time. Rewards could be made in terms of accumulated points leading to promotions. And a most effective reward could be a monetary bonus accompanied by public recognition of achievement, via the bulletin board and/or a company newsletter.

In sum, if supervisors have done their jobs well, they should receive maximum reinforcement. No less is acceptable to higher levels of management.